

In the Claims

This listing of claims will replace all prior versions and listings of claims in this application:

1. (Previously presented) A method of releasing a glazing panel from a frame to which the panel is bonded by interposed bonding material, the method comprising:
 - i) arranging a pulsable light energy delivery apparatus adjacent the glazing panel; and
 - ii) operating the light energy delivery apparatus to transmit pulsed light energy comprising at least one light pulse event through the glazing panel to effect release of the glazing panel from the frame, wherein the light energy delivery apparatus is controlled to inhibit a following light pulse event if the time elapsing after a preceding light pulse event is less than a predetermined time or greater than a predetermined time.
2. (Original) A method according to claim 1, wherein the light energy delivered is of a wavelength substantially in the range 300nm-1500nm.
3. (Original) A method according to claim 2, wherein the light energy delivered is of a wavelength substantially in the range 400nm-700nm.
4. (Original) A method according to claim 1, wherein the light energy delivered comprises a plurality of wavelengths.
5. (Previously presented) A method according to claim 1, wherein the light energy attenuates significantly with distance such that at a few centimeters from the energy delivery apparatus the light energy density is significantly diminished from its maximum value.

6. (Previously presented) A method according to claim 5, wherein at a distance substantially in the range 5cm or less from the delivery apparatus the light energy density is 50% maximum value, or below.

7. (Original) A method according to claim 1, wherein the light energy is non-coherent.

8. (Original) A method according to claim 1, wherein the light energy delivered is pulsed according to a predetermined regime.

9. (Previously presented) A method according to claim 8, wherein the pulse duration (T on) of the light pulse event is substantially in the range 1 μ s-100ms.

10. (Previously presented) A method according to claim 9, wherein the pulse duration of the light pulse event is substantially in the range 1ms-2ms.

Claims 11-12 (canceled)

13. (Previously presented) A method according to claim 1, wherein the pulse duration (T on) is less than a minimum permissible inter-pulse interval (T off).

14. (Previously presented) A method according to claim 8, wherein a single pulse of light energy delivered is of sufficient energy to effect separation of the glazing panel from the frame along a length of the bonding material.

15. (Previously presented) A method according to claim 1, wherein the light energy delivery apparatus is sized to enable it to be hand held and positionable relative to the glazing panel manually by an operator.

16. (Previously presented) A method according to claim 1, wherein the energy delivery apparatus comprises electrical gas discharge apparatus.

17. (Previously presented) A method according to claim 16, wherein operation of the gas discharge apparatus is controlled to limit either one of the pulse rate or duration of the light pulse.

18. (Original) A method according to claim 17, wherein the operation of the gas discharge apparatus is controlled by:

- i) charging a capacitor arrangement;
- ii) initiating a trigger pulse to discharge the capacitor arrangement; and,
- ii) discharging the capacitor arrangement through an inductor to the gas discharge apparatus.

19. (Previously presented) A method according to claim 17, wherein the gas discharge apparatus is fed with a current at times other than during a pulse event.

20. (Previously presented) A method according to claim 19, wherein the current is monitored to provide an indication of the operability of the gas discharge apparatus.

21. (Previously presented) Apparatus for releasing a glazing panel from a frame to which the panel is bonded by interposed bonding material, the apparatus comprising:

a light energy delivery head arrangeable adjacent the glazing panel, said delivery head including an electrically operable light emitting element that is operable to transmit non-laser, pulsed light energy comprising at least one light pulse event through the glazing panel to effect release of the panel from the frame;

a base unit remote from the delivery head, the base unit including a supply of electrical power for the light emitting element of the delivery head; and

a flexible umbilical extending between and connecting the base unit and the delivery head.

Claim 22 (canceled)

23. (Previously presented) Apparatus according to claim 21, further including a control system to either one of adjust or limit at least one of:

the pulse repetition rate of successive light pulse events;
the duration of the light pulse event; and
the intensity of the light delivered.

24. (Previously presented) Apparatus according to claim 21 including a control system for controlling one or more apparatus parameters including the minimum permissible time elapsing between subsequent pulse events of the light emitting element.

25. (Previously presented) Apparatus according to claim 21, wherein the delivery head includes a manual trigger for initiating a light pulse.

26. (Previously presented) Apparatus according to claim 21, wherein the apparatus includes a safety interlock comprising at least two input devices that must be actuated before light energy can be output from the light emitting element.

27. (Previously presented) Apparatus according to claim 26, wherein the delivery head includes the at least two input devices.

28. (Previously presented) Apparatus according to claim 26, wherein the input devices comprise switches.

29. (Previously presented) Apparatus according to claim 26, wherein following actuation the input devices are reset to a non-actuation state.

30. (Original) Apparatus according to claim 21, wherein a controller is provided for selectively adjusting the intensity of the light delivered.

31. (Previously presented) Apparatus according to claim 21, wherein the apparatus includes different preset settings which may be switched to adjust one or more parameters of the light energy delivered.

32. (Original) Apparatus according to claim 31, wherein adjustable light energy parameters include:

light intensity; and/or,
pulse duration; and/or
pulse interval.

33. (Previously presented) Apparatus according to claim 21, wherein the light emitting element comprises an electrical gas discharge device.

34. (Original) Apparatus according to claim 33, wherein the electrical discharge device includes a light emitting discharge tube.

35. (Previously presented) Apparatus according to claim 34, wherein the electrical gas discharge device includes a pair of light emitting discharge tubes arranged in side by side relationship.

36. (Previously presented) Apparatus according to claim 21, further comprising cooling means for cooling the light emitting element.

37. (Previously presented) Apparatus according to claim 36, wherein the cooling means comprises at least one electrically operated fan.

38. (Previously presented) Apparatus according to claim 33, including a pulse forming network having a capacitor and inductor arrangement in which the capacitor discharges through the inductor to drive the electrical gas discharge device to produce a light pulse.

39. (Original) Apparatus according to claim 38, including a trigger network for initiating the capacitor of the pulse forming network to discharge.

40. (Previously presented) Apparatus according to claim 21, further including a reflector associated with the delivery head arranged to direct emitted light in a predetermined direction.

41. (Previously presented) Apparatus according to claim 21, wherein the delivery head comprises a window through which emitted light is directed.

42. (Previously presented) Apparatus according to claim 21, wherein the delivery head comprises an edge guide arranged to locate against a running edge of the glazing panel.

Claim 43 (canceled)

44. (Previously presented) Apparatus according to claim 21, wherein the light emitting element of the delivery head comprises an electrical gas discharge light emitting device, and the base unit includes an electrical power arrangement having a capacitor for discharging through the electrical gas discharge light emitting device in the head via the umbilical.

45. (Currently amended) A method of releasing a glazing panel from a frame to which the glazing panel is bonded by interposed bonding material, the method comprising the steps of:

directing at least one non-laser light output pulse from a non-laser flashlamp via an optical delivery head at a wavelength to be absorbed by either one of the bonding material or a frit layer on an inside face of the glazing panel about a periphery thereof and conforming to the frame;

moving the optical delivery head to adjacent portions of the glazing panel along a path of either one of the frit layer or the bonding material; and

repeating the at least one light pulse to effect release of the glazing panel from the frame.

46. (Currently amended) A glazing panel releaser for releasing a glazing panel from a frame to which the glazing panel is bonded by interposed bonding material, said glazing panel releaser comprising:

an optical delivery head to direct light at either one of the bonding material or a frit layer on a inside face of the glazing panel about a periphery thereof and conforming to the frame; and

at least one non-laser flashlamp operable to produce the light directed by said optical delivery head in the form of at least one non-laser light pulse at a wavelength to be absorbed by either one of the frit layer or the bonding material to effect release of the glazing panel from the frame.

47. (Previously presented) A glazing panel releaser for releasing a glazing panel from a frame to which the glazing panel is bonded by interposed bonding material, said glazing panel releaser comprising:

an optical delivery device to direct light through the glazing panel to effect release of the glazing panel from the frame; and

a safety input apparatus requiring at least two input devices to be manually actuated before light energy is delivered by said glazing panel releaser.

48. (Previously presented) A glazing panel releaser for releasing a glazing panel from a frame to which the glazing panel is bonded by interposed bonding material, said glazing panel releaser comprising:

an optical delivery device to direct pulsed light through the glazing panel to effect release of the glazing panel from the frame; and

a control panel apparatus including different settings which are switchable to alter at least one parameter of the pulsed light energy delivered.

49. (Previously presented) Glazing panel releaser according to claim 47, wherein the optical delivery device comprises an electrical gas discharge light delivery mechanism.

50. (Previously presented) Apparatus according to claim 48, wherein the optical delivery device comprises an electrical gas discharge light delivery mechanism.

51. (Previously presented) Apparatus according to claim 50, wherein the light energy parameter includes at least one of:

light energy intensity;

pulse duration; and

pulse interval.